

and the extensive atrial surgery required predisposes one to tachy and brady dysrhythmias. We reviewed the records of all children with UH seen at the Univ. of MI. from 1973 to 1996. 50 children (33 post Fontan at initial implant) ages 3 days to 19 yrs, mean 7 yrs, underwent pacemaker implantation. Diagnoses were tricuspid atresia (TA) in 13, double inlet left ventricle (DILV) in 25, and hypoplastic left ventricle (HLV) in 12. Indications were surgical AV block in 21 - 4 with TA, 10 with DILV, and 7 with HLV. Of those with HLV, 4 had intermittent block and all 7 had required tricuspid valvuloplasty. Post surgical sinus node dysfunction occurred (all post Fontan's procedure) in 19 - 9 with TA, 7 with DILV, and 3 with HLV. Congenital AV block occurred in 10 - 8 with DILV and 2 with HLV. 12 of 50 (24%) had intra-atrial reentrant tachycardia - 4 with TA, 6 with DILV and 1 the HLV. 22 (44%) received DDD systems, 24 (48%) received VVI(R) systems, and 4 (8%) received AAI(R) systems - 2 using a transvenous approach. Of the VVI units 17 were implanted before 1990. Of the remaining 7, 5 had intermittent block rarely needing pacing, and in 2, atrial electrodes could not be placed. Atrial electrodes (N = 28) were Medtronic 4951 and 4965. Ventricular electrodes (N = 61) were Medtronic 6917, 6917A, 4951, and 4965. Atrial acute thresholds (pulse width 0.5 ms) were 0.2-1.7, mean 0.92, volts. Ventricular thresholds were 0.3-2.0 mean 1.01 volts. 4 atrial (14%) and 5 ventricular (8%) electrodes failed with high thresholds (>3.5 volts). Dual chamber pacing is feasible and has been the dominate pacing mode used since 1990 in UH even post Fontan's procedure providing the benefits of AV synchrony, physiologic rate variability and a noninvasive method to convert intra-atrial reentrant tachycardia.

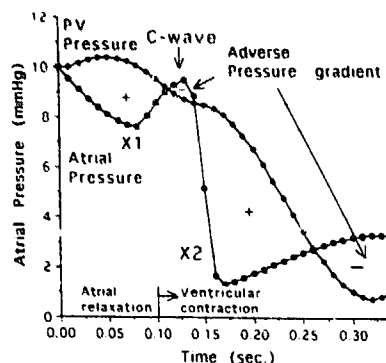
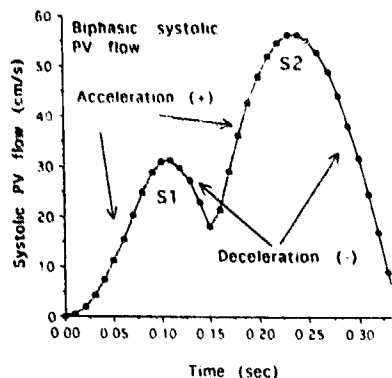
### 1075 Transesophageal Echocardiography

Monday, March 30, 1998, 5:00 p.m.-5:00 p.m.  
Georgia World Congress Center, West Exhibit Hall Level  
Presentation Hour: 3:00 p.m.-4:00 p.m.

### 1075-113 Dynamics of Biphasic Systolic Pulmonary Venous Flow: Mathematical Modeling and Patient Studies

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The genesis and significance of biphasic systolic pulmonary venous flow (BSPV) is not known. The purpose of this study was to determine the hemodynamic correlates of BSPV in patients and examine its dynamics in a mathematical model.



**Methods:** In 68 consecutive pts without significant MR, undergoing intra-operative TEE, the correlates of BSPV were determined. Using a model of the PV tree and left heart that simulates the determinants of the PV to LA pressure gradient, including atrial relaxation, the c-wave with LV systole, and annular descent, the factors underlying BSPV were explored.

**Results:** Patients with BSPV (n = 28) had lower wedge pressures ( $10.2 \pm 3.5$  vs.  $16.4 \pm 6.8$  mmHg,  $p < 0.001$ ) and higher LV fractional shortening ( $58 \pm 1.5$  vs.  $43 \pm 1.4\%$ ,  $p < 0.001$ ) than those without BSPV. The model showed that BSPV is created when atrial pressure exceeds PV tree pressure, creating an adverse pressure gradient and PV deceleration; when a c-wave exceeds a falling PV tree (wedge) pressure.

**Conclusion:** BSPV occurs at lower wedge pressures and more vigorous LV contractions because the c-wave (related to LV contraction) exceeds a low PV tree pressure.

### 1075-114 Value of Transesophageal Echo (V.O.T.E.): A Multicenter International Registry of 8500 Patients From 21 Sites

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The Value Of Transesophageal Echo (V.O.T.E.) international multicenter registry interrogated referring physicians on their impression of the clinical impact of the just completed transesophageal echo (TEE). Since 1992, 8500 pts. have been entered from 21 sites. TEE's were categorized by their referral diagnosis (12 categories) and their impact on: providing new information (NEW), effecting a change in management (MNG.), surgery (SURG), catheterization (CATH) or medical therapy (MED). The most common referral diagnosis to assess cardioembolic source (CVA/TIA), while all valve related disorders combined (native valve (Valve); prosthetic (Prosth) and endocarditis (ENDO)) accounted for 38.7% of pts. ~85% of pts. had a prior trans thoracic echo.

	%	NEW	MNG.	SURG	CATH	MED
All (8500)		51.2	34	9.8	18.4	21.8
CVA/TIA	26	54.5	25.6	5.5	3.6	29.4
ENDO	17.8	51.4	35.7	3.5	6.6	20.2
Valve	13.5	46	38.3	41.1	19.7	9.4
Prosth V	7.5	50	38.3	23.9	13.6	13.9
Ao Dissect	5.8	56.5	42	31.3	16.9	5.8

Overall 32.6% of pts. had at least 1 MNG. and 8.5% had  $\geq 2$ . The overall complication rate was 1.3%, with 15 major events (0.18%). V.O.T.E. confirms that TEE has a significant impact on clinical care, though its value varies by referral dx. Future cost effectiveness studies are warranted.

### 1075-115 Coronary Flow Velocity Profile for Assessment of Heart Transplant Vasculopathy: A Doppler Transesophageal Echography Study

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After heart transplantation (HTx), allograft vasculopathy presents different forms: vessel lesions and/or vasomotion abnormalities. Coronary angiogram lacks in detection of circulation disturbances. The aims of this study were to analyse the profile of increment coronary flow velocity induced by dipyridamole and to determine whether there were correlations with 1) time from HTx and 2) coronary angiogram data. We studied 33 HTx patients: 25 had normal coronary angiogram (group N), 8 presented diffuse minor stenosis in distal branches (group S). The control group (C) consisted of 9 healthy subjects. Doppler transesophageal echography (TEE) was used to measure peak diastolic blood flow velocity (DV) in the proximal part of left anterior descending artery. DV measurements were performed at rest, then every minute during intravenous dipyridamole infusion (0.56 mg/Kg in 4 minutes) and until reach of maximal hyperemic flow. For each patient, we studied the diagram of time/DV relationship and we calculated the slope (SL) of this curve. There was no significant difference between groups concerning rest DV. SL was significantly lower in group S ( $4.3 \pm 1.8$ ) than in group N ( $12.2 \pm 5.6$ ,  $p = 0.0002$ ) and group C ( $13.9 \pm 2.5$ ,  $p < 0.0001$ ). No difference was found between group C and N. However in group N patients, despite normal angiogram, we observed a negative relationship ( $r = 0.56$ ,  $p < 0.004$ ) between SL and time from HTx. In group S, the higher SL was 6.9. In group N, 5/25 patients had SL less than 6.9. This cut-off point identified patients with minor stenosis with a sensibility: 100%, specificity: 80%, positive predictive value: 61.5%, negative predictive value: 100%. Thus, after HTx, TEE analysis of coronary velocity profile might contribute to detect transplant coronary vasculopathy.